

GROUP 3 MAINTENANCE

1. CLEANING

Clean outer parts before repairing. Dust and impurities shorten not only the life span of equipments and parts but also the exchanging periods of them. Flush the parts with clean solvent. Using other kinds of treated oil but solvent may cause damages to rubber goods and skin.

Must follow the steps to clean the hydraulic parts.

- 1) After washing the hose and tube with solvent, blow away with compression air.
- 2) Keep fitting and screw undamaged until protective cap should be put on them.
- 3) Put protective caps on the hose and tube.
- 4) Flush oil tank, fuel tank and inner part of gear housing with solvent to remove the metal filings and welding wastes.
- 5) When you finish with the cleaning, stuff up all the holes to keep them uncontaminated.(Cylinder, valve, tank, pump and motor)
- 6) When you fill up oil, must use clearly filtered oil.
- 7) The purity level in the hydraulic system goes more than ISO CODE 19/16 to the minimum.

2. PARTS REPLACEMENT

Replace rubber goods such as O-ring, seal and gaskets by brand new ones. Never mind the conditions of the parts and must not mix used ones in replacement.

3. HOSE, TUBE

1) INSPECTION

- (1) Replace the hose and tube if damages are found in coupling areas of both ends of the hose(Crushed, dent and oil leakage).
- (2) Surface of the hose should be washed clean without a flaw and replace the hose if any abnormality is found in swaging area.
- (3) Replace the hose if one of the followings is found.
 - Surface damaged or abraded
 - Rust in auxiliary wire
 - Swelled up(Requires immediate replacement)
 - Twisted, crushed, loose or transformed

2) MOUNTING

- (1) When you mount a hose, connect loosely both of the ends and hold the hose toward proper direction and tighten the connections. To prevent damages out of friction, fix it with cramp or tie-wrap not so far as it gets crushed.
- (2) In case of replacing a hose connected to moving parts such as cylinder, be careful not to make it damage from those parts.
- (3) After you finish with mounting, be careful not to make it twisted or wrenched.
- (4) For the hose which is not fixed and is movable in operation, be careful not to make it contacted with other parts around it. Abrasion by contacts shortens the life span of the hose.

4. BEARING

1) REMOVAL

When removing or mounting the bearings or bushings, check for discoloration, flaws, abrasion and overheated marks. Replace any that are not functional.

2) WASHING

For a usable bearing, wash it with solvent and soak it in lubricant for a while.

3) MOUNTING

- (1) Mount the bearing carefully in the prescribed position in accordance with the maintenance procedures.
- (2) The followings show the ways of positioning the bearing.
 - Press it into the rotary equipments such as shaft or gear.
 - Push it into the fixed equipments such as reduction gear and housing.
- (3) When mounting a bearing, assemble in rotary equipment first.
- (4) When mounting a bearing and bushing, use suitable tools and presses.
- (5) If no suitable tools and presses, put the bearing and casing in hot oil so that it gets not enough to be mounted.

5. PRESSURE TEST

Be fore pressure test, check the hose and the connections.

Use a pressure gauge capable of marking the standard pressure. Follow the testing steps correctly, or you may cause damages to the equipments and hydraulic system and accidents as well.

6. TORQUE

1) FASTENER

All fasteners should be in the same class with SAE GR5(PC8.8) unless receiving special regulations. Use the fastener with a gold plating treatment.

2) BOLT, NUT

Unless separate regulations, the permitted limit of torques of bolt and nut is allowed within $\pm 10\%$ of the torques of GR5.(PC8.8)

Standard	Torque		Standard	Torque	
	Inch	kgf · m		lbf · ft	mm
1/4	1.3	9.4	6.0	1.0	7.2
5/16	2.5	18.1	8.0	2.5	18.1
3/8	5.3	38.3	10.0	5.0	36.2
7/16	8.1	58.6	-	-	-
1/2	12.1	87.5	12.0	8.1	58.6
9/16	16.8	122	14.0	13.0	94.0
5/8	22.8	165	16.0	20.0	145
3/4	41.0	297	20.0	36.0	260
7/8	60.0	434	22.0	51.0	369
1.0	88.0	637	24.0	65.0	470

3) FLARE TYPE FITTING(37.C still)

- (1) Set tube and fitting in a straight line.
- (2) Tighten nuts by following values of the torque.

SAE size	Torque	
	kgf · m	lbf · ft
4	1.1 - 1.6	8.3 - 11.7
6	2.6 - 3.1	18.8 - 22.9
8	5.1 - 6.3	37.5 - 45.8
10	6.9 - 8.0	50.0 - 58.3
12	11.6 - 12.6	83.3 - 91.7
14	13.8 - 14.9	100 - 108
16	16.1 - 17.8	117 - 129
20	24.2 - 27.6	175 - 200
24	34.5 - 39.1	250 - 283

4) STRAIGHT SCREW O-RING FITTING(Inadjustable)

- (1) Check for scratches, groove, sharp burr, dents or alien substances on the surface of both screws and the sealing.
- (2) Lubricate the O-ring.
- (3) Value of the torque follow the table below.

SAE size	Torque	
	kgf · m	lbf · ft
4	1.1 - 1.6	8.3 - 11.7
6	2.6 - 3.1	18.8 - 22.9
8	5.1 - 6.3	37.5 - 45.8
10	6.9 - 8.0	50.0 - 58.3
12	11.6 - 12.6	83.3 - 91.7
14	13.8 - 14.9	100 - 108
16	16.1 - 17.8	117 - 129
20	24.2 - 27.6	175 - 200
24	34.5 - 39.1	250 - 283

5) STRAIGHT SCREW O-RING FITTING(Adjustable)

- (1) Check for defects and alien substances in both of the contact surfaces.
- (2) Lubricate the O-ring.
- (3) Full the fitting into the port and turn the back-up washer until it comes in contact with the port to let the back-up washer and O-ring pushed toward the lock nut.
- (4) Turn the fitting a little bit reversely to set it at the prescribed position. At this time, must not turn the fitting more than a round.
- (5) Set the fitting at the prescribed position to tighten the lock nut by following values of the torque.

SAE size	Torque	
	kgf · m	lbf · ft
4	1.1 - 1.6	8.3 - 11.7
6	2.6 - 3.1	18.8 - 22.9
8	5.1 - 6.3	37.5 - 45.8
10	6.9 - 8.0	50.0 - 58.3
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7. HOW TO START NEW EQUIPMENT

When starting new equipments, must take the following steps to prevent each part and system from damages.

- 1) Check for quantity of oil and leakage.
The fluid level of oil in the tank should be on top of the sight plug, if it's new equipment.
- 2) Prop the wheels off the ground.
- 3) Check if the hose, wiring and tubing twisted too much and be in contact with the rotary parts.
- 4) Check mountings of the equipments(Engine, pump, valve and radiator).
- 5) Check if the control linkage should move freely and keep in neutral.
- 6) Pull the throttle lever full backward and crank the starter for 15 seconds and pause for 30 seconds.
Try it again.
- 7) Push throttle lever forward about 1/3 or 1/2 of the way.(Idling position)
- 8) Turn and hold the ignition switch key fully counter clockwise at the PREHEAT position.
When the key switch is set to preheating operation, the timer starts counting the specified time while the heater lamp is lit. After 15 seconds of preheating, the timer turns off the air heater lamp to indicate that preheating is completed.
- 9) When the air heater lamp goes out, turn the ignition switch to START position.
If the engine does not start within 10 seconds. Repeat PREHEAT operation.
Do not use the starter motor continuously more than 30 seconds.
- 10) As soon as it comes to normal operation, return the engine switch to ON position.
▲ This diesel engine uses air heater for starting. Do not use any auxiliary fuel to help starting. It may cause explosions or accidents.
- 11) Check the alternator warning lamp and engine warning lamp. The lights illuminate during engine start and go out when the engine run.
Alternator warning lamp lights when the battery charger is not producing sufficient current in the generator. Engine warning lamp responds to engine hydraulic and coolant temperature. Oil temperature warning lamp lights when hydraulic oil in the reservoir is overheated. If the light comes on during operation, shut the engine off immediately and determine the cause.
- 12) If engine starts, release the ignition key.
- 13) Push the steering lever all the way forward and pull it backward. Try it three times.
- 14) If necessary, adjust the linkage of the steering lever.
- 15) Push the throttle lever full forward and operate the foot pedal for three minutes at an interval of 3 seconds to raise the hydraulic oil temperature.
- 16) Stop the engine and check for oil leakage.
- 17) Fill up the oil until you can see the fluid level on top of the sight plug.

8. QUANTITY OF OIL AND LUBRICATION

1) CHAIN SPROCKET HOUSING

Put the loader at a flat place and pull out the plug between the two wheels to check oil level.
The fluid level of oil should be in the same level with the bottom of the plug boss.

2) OIL TANK

Put the loader at a flat place and check the sight gauge plug after oil cools. If the fluid level of oil can be seen on plug nothing is abnormal. If it is not seen on the plug fill up the oil immediately.

3) ENGINE OIL

The fluid level of oil should be on top of the deep stick.

4) COOLING SYSTEM

The coolant in radiator should be within 25mm and less from the radiator fill neck.

5) SPLINE

Paint molybdenum disulfide compound to the splines in the operating motor and pump.

6) GREASE FITTING

(1) Inject grease into these parts.

- Rear boom pivot pin(2)
- Implement pivot pin(2)
- Boom and tilt cylinder(8)

(2) Remove the extra grease.